

# Space News Roundup

Vol. 23 No. 8

April 27, 1984

National Aeronautics and Space Administration

## Repair mission became high drama

Almost exactly four days into Flight 41-C, mission controllers at JSC and Goddard held their breaths, figuratively and in some cases literally, as *Challenger* went over the hill.

The past 45 hours had been consumed with preparations for this moment, and now the critical first rotating grapple attempt on Solar Max was coming right at a loss of signal through TDRS East.

At that point, *Challenger* was approaching the terminator and darkness as it flew along over the southern Indian Ocean. The forward reaction control system propellant level, critical for the close maneuvering, was down to 14 percent. Even with fuel saving measures designed by Rick Hieb and others at JSC, and with Commander Robert Crippen's precise piloting, there clearly would not be enough propellant for very many grapple attempts.

All that was known on the ground as *Challenger* went LOS was that the Shuttle's robot arm was in motion. There would be a six minute wait for re-acquisition through the Yarragadee tracking station to see if Mission Specialist Terry Hart was successful in his grapple attempt. "We know we're in good hands and use nice soft gloves," Capcom Jerry Ross radioed to the crew.

That there even was to be a grapple attempt was something of a minor miracle. Nearly two days before, the first try at snaring Solar Max failed when the trunnion pin attachment device mounted on Mission Specialist George "Pinky" Nelson's jet backpack would not close on one of two target pins.

Nelson moved back in and tried again. A second and then a third docking attempt failed. Each time, he bounced away from Solar Max. In the process, those attempts imparted new motion rates into the roll, pitch and yaw axes of Solar Max. If the MMU docking procedure would not work—and it was clear by then that it wouldn't—two other options had to come into play, and both were affected by fuel margins.

Back aboard the *Challenger*, the

forward RCS margins were, as a result of stationkeeping, approaching redlines for any MMU rescue scenario. Without that rescue capability, no later MMU flight would be allowed. Nelson, meanwhile, was reaching fuel safety margins himself, and would soon have to return to the Orbiter. The chances for snaring Solar Max with another MMU flight—after swapping TPADS and MMUs in the cargo bay—were dwindling rapidly.

This brought the secondary option, a rotating grapple, into play. This procedure had been simmed, and involved maneuvering *Challenger* itself into an exacting dance with Solar Max and the laws of motion so that the robot arm could snake out, reach up under the solar panels, and grab the satellite. This procedure had little chance of success, however, if the rates on Solar Max were above 0.7 degrees per second.

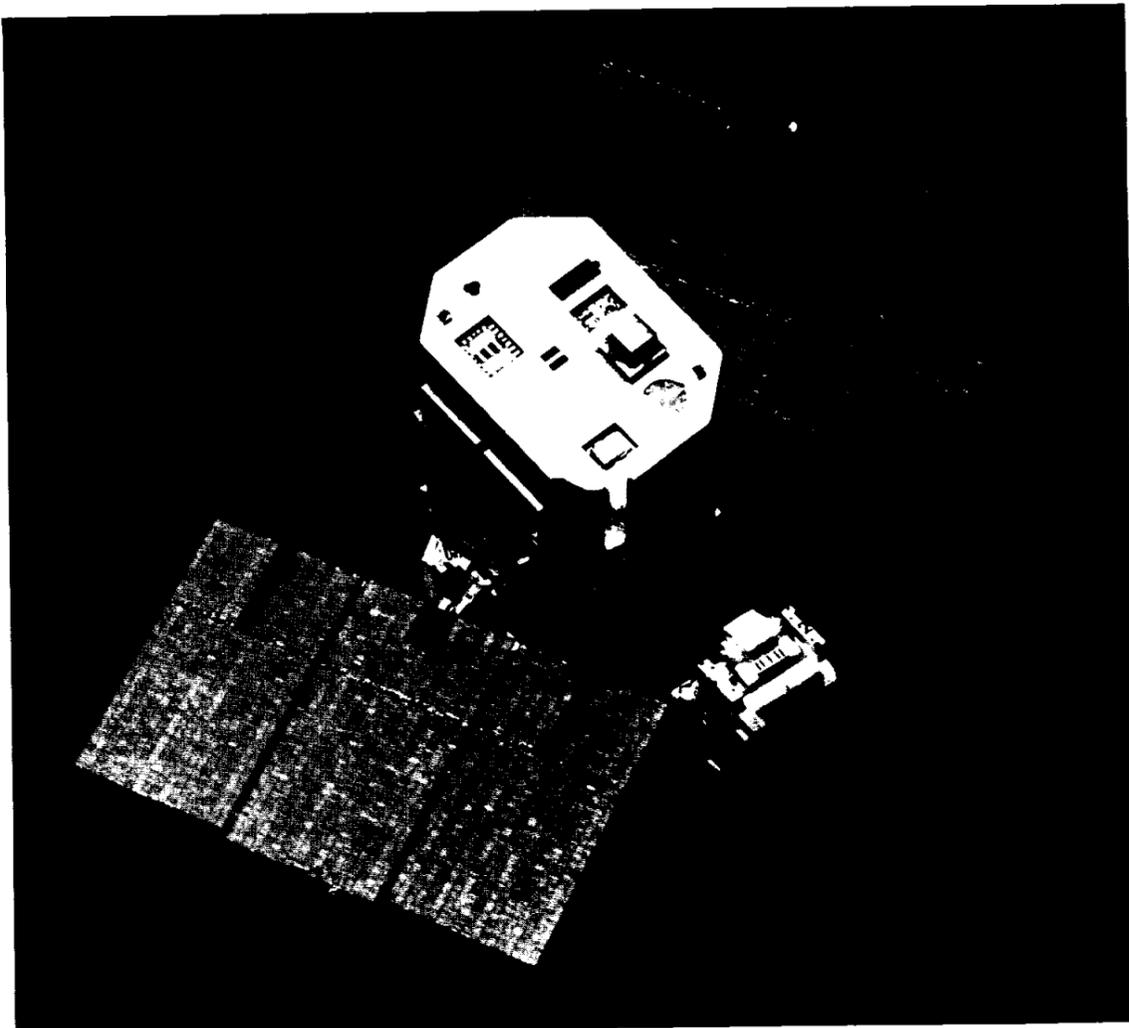
To preserve the rotating grapple option, Crippen suggested that Nelson grab one of the solar panels with his gloved hand with the MMU in attitude hold mode.

"Pinky, you've started that rotation about to your left now. We really need to stop that to do a rotating grapple," he said.

Nelson moved out to the middle of one of the solar arrays and held on, letting the MMU damp out its own motion and that of Solar Max. The maneuver appeared to work, both visually to crewmembers back on *Challenger*, and, briefly, to controllers at Goddard. With that visual indication that the rates had been reduced, and with low fuel margins in the MMU and the *Challenger's* forward RCS, Crippen instructed Nelson to return.

A strip chart of Solar Max telemetry reviewed after the mission showed the roll rate at about one degree per second and the yaw and pitch rates down to two tenths of a degree per second or less for about 30 to 45 seconds after Nelson let go. Then, for reasons as yet undetermined, the rates began building back up again.

Nelson flew back to the payload  
(Continued on page 2)



George Nelson closes in on Solar Max in his first docking attempt in the photo above. A small pin on the trunnion is thought to have prevented a successful docking. Below, Nelson and James van Hoften work by the light from their suits to replace the Main Electronics Box on Solar Max.



### Ceppy, Goddard send thanks

I wish to express my sincere thanks to all JSC civil servants and contractor employees for your outstanding efforts in making mission 41-C a tremendous success. Through your efforts over the last three years of planning, hardware development, training, and flight simulations, you have played a vital role in the success of this first repair mission. Of even greater significance, your judgement, support, and wisdom provided during our hours of crisis assisted our JSC/GSFC team in making the right critical decisions, and to ultimately achieve an incredible accomplishment.

The engineers and managers at GSFC have asked me to express to all of you their respect and admiration for your efforts, and appreciation for a job well done.

Through your "can do" attitude and support in the last three years, through your tenacious efforts in the last few months of training and simulations, and through your "never say die" determination in our critical hour, you have made history. You have opened a brand new era of space flight.

May I extend to you my pride in this agency and in Johnson Space Center, and my congratulations to each of you.

Frank J. Cepollina  
SMRM Project Manager

## Editorial

### Fly the friendly skies

About eight hours after executing a deorbit burn and swooping down from 265 nautical miles to land on a desert runway in California, Bob Crippen got off a Gulfstream at Ellington Air Force Base, kissed his wife hello, accepted the congratulations of friends waiting to greet him and his crew, and then got in his red pickup truck and drove out to JSC to join the folks here in a celebration at the Rec Center.

That sequence of events says as much as anything ever will about routine travel to and from space. Routine access to low Earth orbit was one of the Shuttle Program's major advertised features, and the capability has been achieved. Prior to Mission 41-C, the one remaining capability yet to be demonstrated was repair in orbit of complex machinery. Now, in the wake of all that was accomplished earlier this month, it can be said that in that capability too, we have arrived.

The mission that Crippen, Dick Scobee, T. J. Hart, James van Hoften and George Nelson flew was described by United Press International as "America's boldest adventure in space since men last walked on the Moon in 1972." *Aviation Week* called it "a mission that may go down as one of the most crucial for the Shuttle in all its history." You'll find no argument with those assessments here. But for more than its short term importance to the good fortunes of both the Solar Max satellite and the Long Duration Exposure Facility, Flight 41-Charlie will stand out as perhaps the most visible thing

we've done yet in convincing private enterprise to venture out into space with us.

Space flight is expensive, and no reasonable business person will invest large sums of money without evidence that fixes are possible when things go wrong. The fix that was applied to Solar Max, daring enough before the flight and even more compelling in light of the adversity introduced by several unsuccessful grapple attempts, was the kind of demonstration of space flight maturity that the business community needed. And the lessons of the mission apparently were not lost on the insurance community, either. Former Associate Administrator James Abrahamson said in a post landing briefing that insurance companies are now talking about reducing premiums on satellites outfitted with Shuttle-compatible grapple fixtures.

NASA is now able to look with confidence to other potential repair or retrieval missions, such as Landsat 4 and perhaps even the Palapa and Westar satellites which failed to achieve geostationary orbit during Flight 41-B. The way is now clear to get on with more and more complex orbital operations. Thanks to the pioneering efforts of the last two Shuttle flights, America's government and industry team promises to be well beyond the level of mere competency when even more ambitious projects come early in the next decade.

When the Space Station is ready for occupancy in about six years and counting, we'll be more than ready ourselves.

## Space News Briefs

### HMS Challenger sends congratulations

The Captain and crew of the Royal Navy seabed operations vessel HMS *Challenger* have sent congratulations to the crew of Mission 41-C, who recently flew another vessel named *Challenger*. "Please pen the congratulations and best wishes of the commanding officer and ship's company of the British Navy seabed operations vessel HMS *Challenger* to the commanding officer and crew of the Space Ship *Challenger* on their return from a triumphant and historic mission. We hope we will be as successful down below as you have been up there," the message read. The Orbiter *Challenger* was named for an American research vessel that made extensive oceanographic cruises in the Atlantic and Pacific Oceans during the 1870s. The Apollo 17 lunar module that transported the last American astronauts to the surface of the Moon in 1972 also carried the name.

### Landsat 5 turned over to NOAA

With checkout and activation of the recently launched Landsat 5 spacecraft complete, NASA earlier this month turned over space operational control of the Earth resources satellite to the National Oceanic and Atmospheric Administration. The 4,300-pound spacecraft was launched March 1 from Vandenberg Air Force Base into 438-statute mile, near polar orbit. During March and the first part of April, engineers at the Goddard Space Flight Center acquired more than 1,000 images from the multispectral scanner and about 650 scenes from the thematic mapper aboard Landsat 5.

## Bulletin Board

### Don't forget the JSC Picnic May 5

This year's JSC Picnic, "The Picnic With the Right Stuff," will be held from 11 a.m. to 5 p.m. at the Gilruth Recreation Center. The picnic will feature a Texas barbeque dinner, skydivers, a dunk tank, an obstacle course, the Almost Anything Goes contest, softball, volleyball, a horseshoe tournament, a battle of the bands and Johnny Dee and the Rocket 88's, a 50's and 60's rock and roll band. There will also be rides for the kids and bingo. All federal and contractor employees and retirees are welcome. Tickets are \$3.50 for adults and \$2.50 for children.

### JSC Sailing Club to meet

The JSC Sailing Club will hold its next monthly meeting at 7 p.m. May 1 at 260 El Dorado, Apt. 3205. All interested persons are welcome. For more information, call 486-0154.

### JSC Aero Club has membership drive

The JSC Aero Club is now accepting new membership applications for flying at club rates. Members may rent a Cessna 152 or a four-place Piper Archer II with auto pilot, and the club's equity arrangement makes possible comprehensive flying insurance. Dues for members are \$25 per month, and the planes are based at Houston Gulf Airport near League City. One club member is a certified flight instructor, available for beginning lessons or advanced flight instruction. Membership is open to JSC employees and contractors. For more information or membership application forms, call T. Wilson at x3431 or J. Haptonstall at x5238.

### Osborne and CP/M Group to meet

The next regular meeting of the Clear Lake Osborne and CP/M Group will be held at 9 a.m. May 12 at the Gilruth Recreation Center. The group offers presentations, question and answer periods and free access for members to a library of over 100 disks. For more information, call Maynard Huntley at x6441 or write P.O. Box 57613, Webster, TX 77598.

## Hutchinson to head Station Office

Neil B. Hutchinson will head the Space Station Program Office at JSC and John W. Aaron has been named Deputy Manager.

The appointments were announced April 9 by JSC Director Gerald D. Griffin.

Hutchinson has been serving in a staff assignment to Griffin since his return in January from a one year assignment at NASA Headquarters, where he was Director, Space Shuttle Operations Office in the Office of Space Flight. Hutchinson has worked at JSC since 1962.

Aaron has been Chief of the Spacecraft Software Division here since 1981 and has worked at JSC since 1964.

Hutchinson, after coming to NASA in the early 1960s, worked on the design and development of the Mission Control Center's Real Time Computer Complex. He served as a Flight Director for the final Apollo lunar landing mission, Apollo 17, for all three

Skylab manned missions in 1973-74, for the Apollo-Soyuz Test Project in 1975 and for Shuttle developmental and orbital test flights from 1977 to 1981.

In addition to his flight control and flight director responsibilities, Hutchinson has served as Head of the Systems Logic and Processing Section, Assistant Chief of the Apollo Command and Service Module Systems Branch, Chief of the Guidance and Propulsion Systems Branch and Deputy Chief of the Flight Integration Office at JSC.

Aaron's career includes service as Avionics Flight Software Project Manager for the Shuttle Approach and Landing Tests and Orbital Flight Test Programs, as Technical Assistant to the Chief, Spacecraft Software Division, and as Section Head for Electrical Power, Sequential and Instrumentation Systems for the Apollo Command and Service Module.

In addition to his organizational

responsibilities, Aaron served as a flight controller responsible for vehicle systems operation during the Gemini, Apollo and Skylab programs.

Hutchinson graduated from Willamette University in Salem, Oregon in 1961 with a degree in mathematics and physics. He worked at the U.S. Naval Weapons Laboratory in Dahlgren, Virginia as a mathematician from 1961 to 1962. He joined the Manned Spacecraft Center (now JSC) in 1962.

He is married to the former Karen L. Zollman of Wichita, Kansas. They reside with their two children in Clear Lake City.

Aaron received his degree in physics from Southwestern State College in Weatherford, Oklahoma and joined the Manned Spacecraft Center in 1964. He is married to the former Cheryl Hart of Vinson, Oklahoma. He and Mrs. Aaron reside with their son in Houston and have a daughter attending Texas A & M University.

## Huntoon named Assistant to Director

Dr. Carolyn Huntoon has been detailed to the position of Special Assistant to the Director, Johnson Space Center. Huntoon will perform many of the duties previously assigned to Henry E. Clements, Associate Director, who is on temporary duty as JSC liaison at

the Air Force Space Command in Colorado Springs, Colorado.

Dr. Huntoon joined NASA in 1970

after completion of a two-year National Research Council Postdoctoral Fellow assignment at JSC. In 1974, she became Head of the

Endocrine Laboratory and since 1976 has been Chief of the Biomedical Laboratories Branch. Dr. Huntoon holds a B.S. degree in Biology from Northwestern State College of Louisiana, and M.S. and Ph.D. degrees in Physiology from Baylor College of Medicine.

## Repair turns to drama

(Continued from page 1)

bay, and once safely secured, Crippen moved *Challenger* in for the grapple attempt. After four tries, he reported to the ground, "Close, but no cigar." The rates were too high.

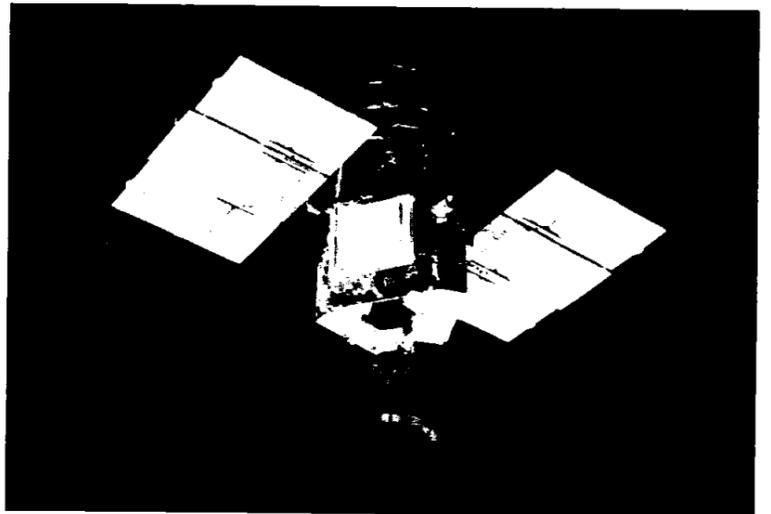
By the end of that flight day, which *Aviation Week* referred to as "Black Sunday," Solar Max was in critical condition. The new wobble kept its solar arrays from pointing accurately at the Sun, and the nickel-cadmium batteries were draining. Goddard's Payload Operations Control Center had begun to command systems off to save power. Worse yet, controllers discovered that a procedure to arrest the motion rates, implemented after the last grapple try, was not working, and that the gyroscopes aboard were sending faulty data to the ground. Three hours had passed with no effect on the rates, and the outlook was grim.

At that point, Goddard began sending up an entirely new attitude program for Solar Max's onboard computer. The software, called Bdot, ignored the gyros and made use of data from the onboard magnetometers only. Goddard was using Earth's magnetic field to provide a small current to the seven functional magnetic torquer bars. The bars in turn would provide just enough power to the reaction wheels to slowly damp out the rates. At 32 kilobits per second, it took over two hours to load Bdot. It was then a race against time.

By 6 p.m., the positive effects of Bdot were being seen on the ground. The momentum was decreasing, although battery drain was still a critical problem. About four hours later, POCC Director Bill Stewart told Mission Control that while the dampening rates were promising, Solar Max was entering a crucial eclipse on the dark side of the Earth.

"If we can make it through this eclipse, we can make it until the next eclipse," he said. "But we may not make it through this one." The nicads were nearly depleted, in other words, and it didn't look as if they would last long enough to keep the spacecraft alive until sunlight reached its arrays again.

By midnight, things began to turn around. The batteries were no longer discharging. The momentum was low enough that the solar panels were able to gather enough power to slowly revitalize Solar Max. The repair mission was still on.



Solar Max after the repair.

Another rendezvous was ruled out for the following day to allow Solar Max to completely stabilize. In the meantime, controllers at Goddard had to reload the entire original attitude control program to maneuver Solar Max towards its most efficient sun-pointing position.

Now it was Tuesday, almost 8 a.m. Houston time. After very nearly dying in orbit, Solar Max was spinning slowly, ready for another grapple attempt. Six minutes passed between LOS TDRS and AOS Yarragadee.

"Challenger, Houston. Standing through Yarragadee," Ross radioed.

"Okay, we've got it, and we're in the process of putting it in the FSS," Crippen answered. Hart had made what President Reagan called "one long reach for man," and on the first try.

"Outstanding!" Ross replied, as cheers and clapping reverberated through Flight Control Room 2. Flight Director John Cox punched

the air in triumph.

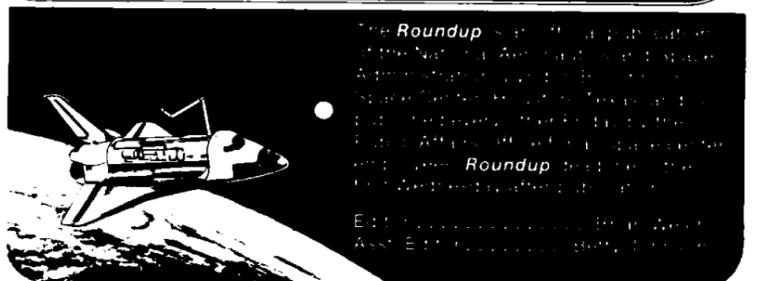
The next morning, James van Hoften and Nelson again entered the payload bay, to begin the second longest EVA (at 7 hours and 18 minutes, it was about 19 minutes shorter than an Apollo 17 lunar excursion) in NASA history and one of the most successful. Working well ahead of the timeline, they successfully replaced the faulty Attitude Control System on Solar Max and the Main Electronics Box which powered the coronagraph/polarimeter experiment. When the repairs were completed, an hour ahead of schedule, there was still time for van Hoften to test fly an MMU within the confines of the payload bay.

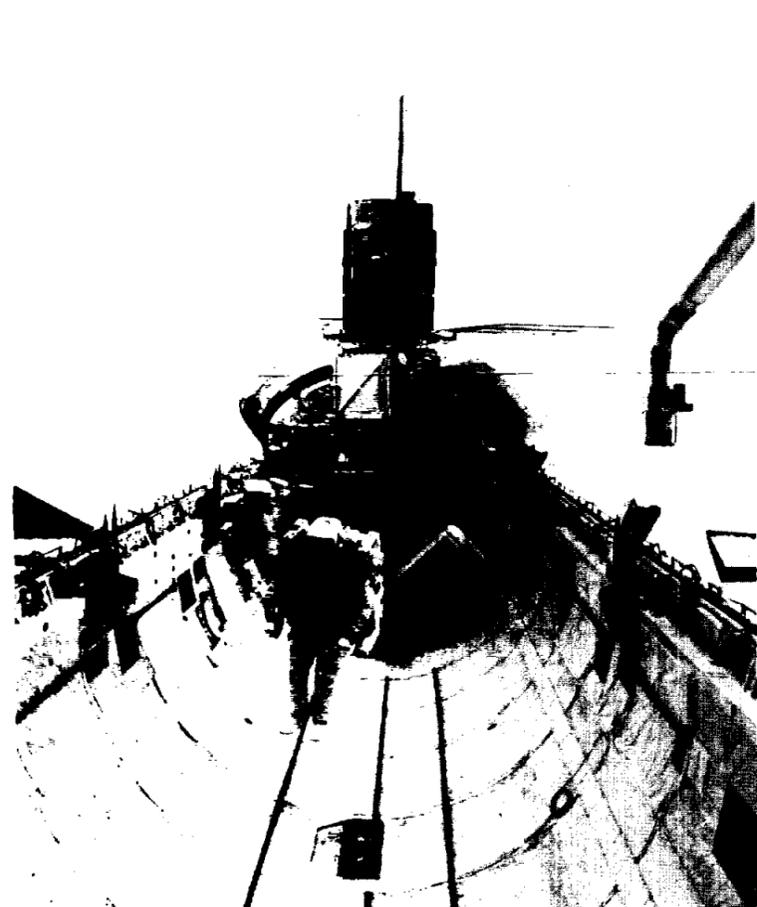
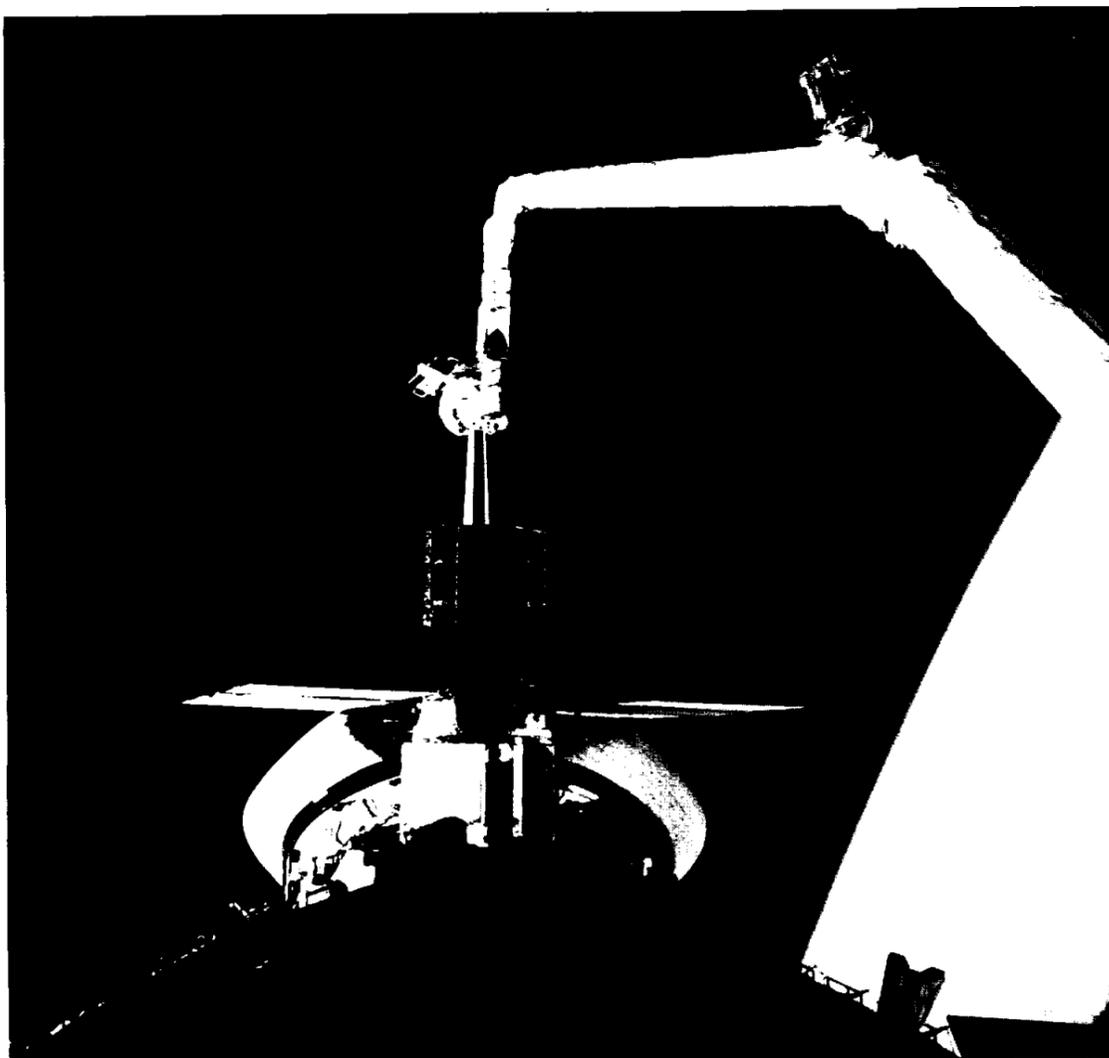
Set adrift in space the following day, Solar Max was in perfect health as *Challenger* moved slowly away. It was orbit number 23,013 for the satellite, and for the teams at Goddard and JSC, everything was right with the world.

—Brian Welch

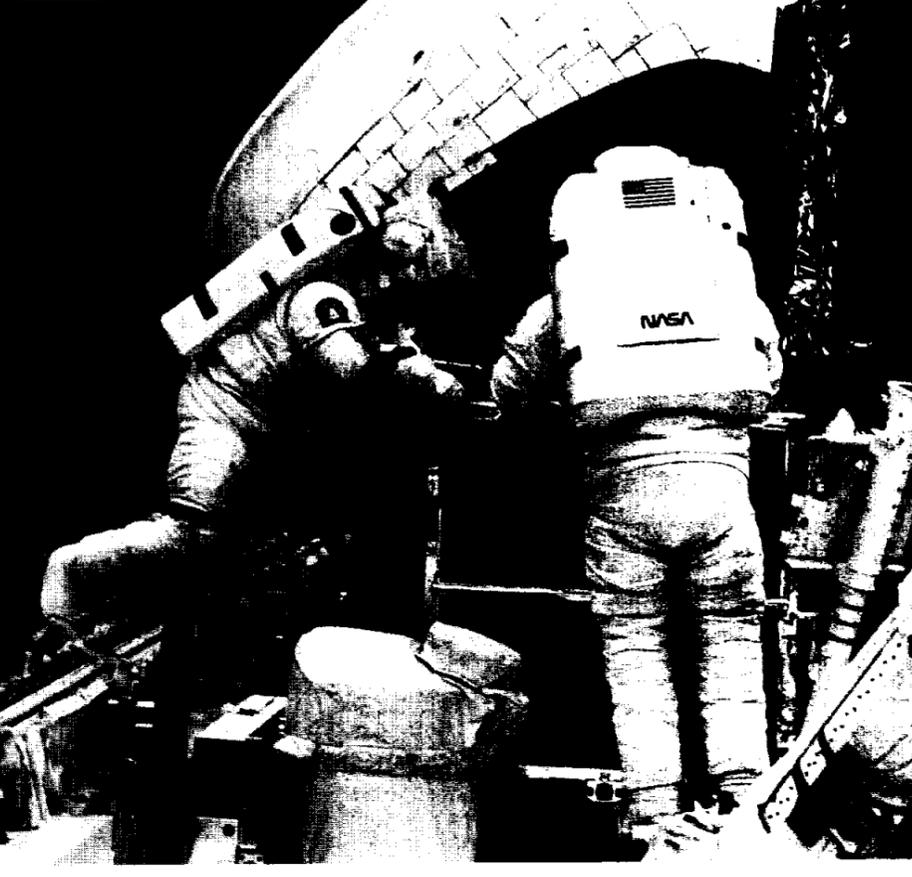
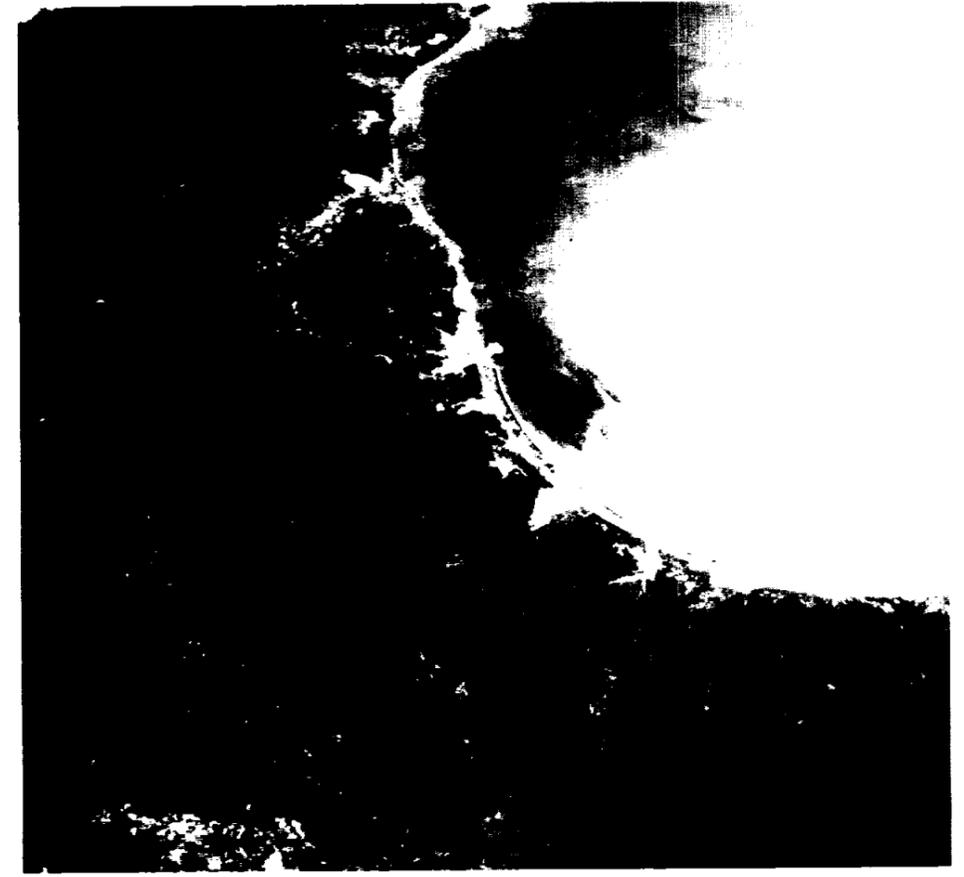
NASA  
Lyndon B. Johnson Space Center

## Space News Roundup





**A**ll the components of a successful repair mission are seen in the photograph at upper left. George Nelson, secured to the Manipulator Foot Restraint and the Remote Manipulator arm, makes a last visual inspection of Solar Max. The bright dot between the limb of Earth and the crook of the arm is the Moon in gibbous phase. At upper right, the Long Duration Exposure Facility floats free in space shortly after deploy. At left, James van Hoften tries out the Manned Maneuvering Unit during the second EVA. Below left, the entire Texas coastline and part of Louisiana are visible from 265 nautical miles. At bottom right, Nelson and van Hoften gather tools in preparation for the repair job. At right, the crew shares a moment of triumph following the landing at Edwards Air Force Base.



# Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP 3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

## Property & Rentals

For rent: Galveston-by-the-Sea condo, 2 BR, furnished, for rent by day (2 minimum), week or month. Call Clements, Jr., 474-2622.

For rent: Galveston gulf front condo, treat yourself to a relaxing 2-day to 1-mo. vacation in this completely furnished condo, low rates. Call Nussman, 488-7762.

For lease: El Dorado Trace, 2-1 condo, all appliances, security system, pool/clubhouse, cov. parking, \$375/mo. Call 937-7606 after 6 p.m.

For lease/rent: House, Friendswood, 2 bath, 2 BR, garage, lawn, trees, refrigerator and microwave, 1/4 mile schools, \$500/mo. Call 482-6816, x3566 or x3781.

For lease: 2 BR-1 bath condo at The Landing, NASA 1, tennis, swimming pool, boat dock, all util. paid, \$525. Call Sarah, 280-0944.

For lease: CLC, Baywind II, 1 BR condo, 2 ceiling fans, F/P, kitchen appliances, W/D connection, exercise room. Call Jim Briley, x2831 or 488-7901 after 5 p.m.

For lease: House in Friendswood, 4-2-2, partly furnished, \$495/mo. Call 334-4184.

For lease: Clear Lake City, nice 3-2-2, fenced, patio, \$525/mo. = deposit. Call 331-3034 after 6 p.m.

For lease: League City/Newport, 3-2-2, FP, skylights, miniblinds, quiet neighborhood, large lot, \$525/mo. Call 338-2130 or 334-6138.

For rent/lease: Friendswood, 3-1 1/2-1, large fenced backyard, trees, f/p, near schools, immaculate, \$450/mo. + deposit. Call 482-7546.

For lease/rent: Baywind I condo, 1 BR, swim, tennis, clubhouse, \$310/mo. + deposit. Call 538-4766.

For lease: Heritage Park home, 3-2-2, furnished or unfurnished, 1,700 sq. ft., all electric, \$650/mo. Call Roy, x3591 or 488-6326 after 6 p.m.

For lease: Baywind II condo, 2 BR, 2 bath, FP, W/D, new carpet, all appliances, \$395 mo. + \$150 deposit. Call John McLeaish, 480-7445 nights.

For lease: Piper's Meadow, 3-2-2, FP, mini-blinds, cathedral ceiling, dining room, ceiling fan, extra clean, \$600 + deposit. Call 488-0500 or 480-6516 after 5 p.m.

For rent: University Green, exec. townhome, 3-2.5-2 + loft & large storage room, approx. 1,900 sq. ft., FP, microwave, garage door openers, workshop area. Call Charles Price, x2851 or 488-3685.

For rent: Vacation week in Galveston condo, 2 BR, sleeps 6, fully furnished, April thru Sept., \$325/week. Call Jim, x3751 or 554-7677.

For rent: 3-BR waterfront Rayburn Country vacation house, sailboat, canoe, fishing/ski boat, etc., available. Call Hayes, x7272 or 488-1446.

For lease/sale: Clear Lake area condo, 2-story, 1 BR, 1 1/2 bath, FP, ceiling fan, small patio & balcony, all appliances, W/D. Call James, 996-1391 after 6 p.m.

For lease: 1 BR condo on Tranquility ake, private lake, lighted jogging path, electronic security gates, cov. parking, W/D, microwave, FP, cable TV, large trees, pools, \$380/mo. + \$350 deposit. Call L. Webster, x6451 or 554-6892.

For lease/sale: 3 BR, 2 bath, single garage home, 16807 Townes Rd., \$485/mo. + deposit, or \$52,500. Call Dick, x4017 or 1-538-1246.

For sale/lease: Heritage Park, 3-2-2, central A/H, fenced yard, convenient NASA/Baybrook Mall, lease \$550/mo. + deposit, sale \$58,500 (\$28,000 8.5% assumable loan, owner will carry 2nd with \$8,000 down.) Call Quinn, x4326 or 481-0289.

For lease/sale: El Dorado Trace condo, nice 2-2-2P, W/D, alarms, F/P, tennis, sauna, 5 mi. from JSC, avail. imm., \$450/mo. + deposit, or \$2,000 down. Call John Lo, x4107 or 482-8457.

For sale/lease: El Dorado Way, 2 BR-2 bath condo, F/P, W/D, cov. parking, security system, pool, clubhouse. Call Rick, 480-8223.

For lease/sale: Large 2-story condo, 2-2 1/2-2 CP, FP, W/D, refrigerator, custom drapes & wall coverings, ceiling fan, more, excellent roommate plan. Call 480-0242 after 5 p.m.

For sale: Golfers/fishers, Rayburn Country lot, on #6 fairway, 5-10 min. from lake, short drive; diverting my funds to other retirement property. Call 486-4113.

For sale: Heritage Park, 3-2-2, 1,484 sq. ft., microwave, F/P, fence, landscaped, 12% VA, \$63,500. Call Ron, x4091 or 996-9734.

For sale: 2,2 condo, W/D, F/P, refrig., just off Clear Lake, \$42,000, assumable 9.78% loan. Call 996-0158 after 7 p.m.

For sale: Pebblebrook condo, 1,070 sq. ft., 2-2-2PS, F/P, parquet entry, vaulted ceiling, all appliances incl. W/D, pool, tennis court, \$42,000 negotiable,

assume 11.2% fixed mortgage, \$457/mo. payments, \$5,200 equity. Call Linda, x4086 or 480-3771.

For sale: 2 1/2 acres, wooded, North Brazoria County, on County Road 25, restricted residential, \$7,450/acre, 10% owner financed. Call 472-3067.

For sale: 101 acre farm, Waco area, fruit, pecan & oak trees, bass tanks, tractor, farm equipment, house and furnishings, buildings, utilities, minibikes, \$1,050/arcres. Call Don, x4606.

For sale: Waterwood lot on Lake Livingston, Unit 1, Greentree Village, \$4,000 value, will take \$3,500, owner financed, 10% down, terms. Call 921-7212.

For sale: Beautifully landscaped 3 1/2 year old brick home, large pecans, fenced yard, new carpet & roof, immediate, \$68,900; vets assume 9.75% loan \$597/mo. for \$8,500 equity. Call 484-3387.

For sale: 3/4 acre waterfront lot with access to excellent bass fishing in Brazoria County. Call Don, 554-6205, or 2804244.

For sale: College Station 3 BR house, great for students, 3 blocks from campus, large fenced yard, kitchen appliances, good investment, \$54,900. Call Ted, 334-1278.

For sale: Forest Bend/Friendswood, 3-2-2, FP, patio, fence, VA assumption, formal dining, neat & clean, \$63,000. Call 482-6609.

For sale: Duplex 2-2 1/2-1+1 (1,500+ sq. ft.), 3-2 1/2-1+1 (1,700+ sq. ft.), each features FP, enclosed patio, master BR, deck overlooks pool, 5% down + prepaids, will sell separately. Call 333-2636 after 5 p.m.

For sale: League City/Countryside Oaks, 4-2-2, 2,000 sq. ft., FP, patio, \$88,500, flexible, spec. buyer's discount. Call Jim, x3751 or 554-7677.

## Cars & Trucks

1974 Maverick, 72K miles, runs good, asking \$750. Call 538-4766.

1977 Pontiac Formula, loaded, excellent condition, 2-tone blue, \$3,200. Call 482-7546.

1974 El Dorado convertible, green, white top, leather interior, own a classic, make offer. Call 554-7051.

1978 Thunderbird, 15K miles on new engine, AM/FM, AC, PB, PS, PL, \$2,000 firm. Call Kathleen, x481-2871.

1977 Buick Electra, 4-door, automatic, full power, vinyl top, white/blue, excellent condition, one owner, \$3,250. Call 482-2878 after 5 p.m.

1982 Chevrolet Cavalier, 2 door, PS, PB, AC, AM/FM, 4 cyl., std. trans., excellent condition, good gas mileage, \$3,995. Call Charles, x4151 or 487-2202 evenings.

1977 Chevrolet Monte Carlo, 305V8, good condition, new tires, FM-AM, cruise, \$1,825. Call 482-1535.

1977 Chevy 4-dr. Impala, PS, PB, AC, air shocks, new paint, excellent condition. Call 334-3227.

1974 Plymouth Sport Suburban station wagon, PB, PS, AC, excellent condition. Call 334-3227.

1980 Chevrolet Malibu Classic S/W, 62K mi., V-6, cruise, AC, car top carrier, excellent condition, \$3,750. Call Mike, x5045 or 480-2537.

1972 Triumph Bonneville 650, like new, only 14K mi., features new tires, chain, battery and exhaust, \$1,200. Call 482-6763.

1975 Firebird, manual transmission, excellent condition, \$2,400. Call North, 482-2154.

1978 Impala wagon, 77K mi., V8, PS/PB, cassette/AM/FM, cruise control, very good condition, \$1,800. Call Boykin, x6316 or 481-0050 after 5 p.m.

1982 Ford Futura, 6 cyl., AC/PS/PB, White steel-belted radials, excellent condition, \$4,450 (NADA Retail \$5,150). Call Barr, x4871 or 485-6074.

1982 Camaro Z-28, excellent condition, low mileage, AC, AM/FM/cassette, automatic, \$8,900 or best offer. Call Mike, 474-5228 after 4:30 p.m.

1975 Datsun B210, \$900. Call Bob Patlach, x3601.

1976 Chevette, 2-door hatchback, good engine, tires, needs painting, \$400. Call Gerry, x5298 or 409-762-1529, leave message.

1980 Chevy Chevette, low mileage, A/C, \$2,900. Call Richard, x5545 or 946-2523.

1982 Chevy SWB Silverado PU, 305 V-8, auto, loaded, excellent condition, 26K miles, \$7,500. Call 474-2660.

1973 Camaro, air, automatic, great condition. Call 482-6660.

1982 Olds Cutlass Supreme, AM/FM stereo, power, excellent condition, one owner, \$6,200. Call 694-5477.

1971 Ford Torino 2-door hardtop, A/C, uses regular gas, runs good, \$300 or make offer. Call Barbara, x6364.

1972 Pontiac Catalina, runs good, \$325; 1977 AMC Matador, PS, PB, A/C, \$1,700. Call Kevin, x5121 or 996-0401 after 5 p.m.

1978 Pinto wagon, 70K miles, AC, AM radio, 4-speed, good condition, \$1,375. Call Dale, x2321 or 486-8016 after 6 p.m.

1981 Chev. Citation, 2-door, HB, 4 Cyl, PS/PB, auto, air, stereo, cruise, 42K mi., good MPG, very pretty, blue, \$3,500. Call 338-2445 after 5 p.m.

1975 Gran Torino Ford, 45K mi. only, AC, auto, radio, excellent condition, asking \$1,500. Call Estrella, 481-2851 after 5 p.m.

1971 Dodge Coronet, automatic, PS/PB, runs well, body not too great, many new parts, good work or student car, asking \$375. Call Greg, x6386 or 476-4448.

1957 Chevy BelAire 2-door/HTP, complete restoration; 1978 Monte Carlo, loaded, all options, sun roof, good cond., \$2,950. Call Noakes, 482-3546 after 4:30 p.m.

1980 Chev. Citation, 2-door sedan, 4-speed, PB/PS, tilt wheel, excellent condition, \$1,950 or best offer. Call 480-8520 after 5 p.m.

## Cycles

1975 Yamaha RD350, 7,300 mi., great shape, best offer over \$500. Call Phil Sheridan, x4336 or 474-3676 after 5 p.m.

## Boats & Planes

16 1/2' Invader, 115 hp Merc, walk-thru, tri-hull, big wheel trailer, all original, garage kept, fully equipped, excellent condition, \$3,575. Call 280-8264.

14' Lowline River John boat with 6 hp Johnson, \$950. Call Young, x4164 or 334-2187.

17' Grumman standard canoe, \$350 firm. Call Wayne Pitman, x3031.

1979 24' Pennyan cabin cruiser, flying bridge, 250 hp single 360 Chrysler, low hours, depth finder, sportsman galvanized tandem trailer, \$10,000. Call Don, x6596 or 554-6733.

Aircraft for rent: Cherokee Lance, 6-place, club seating, 160 knots true, \$85/hr. wet; Cherokee 140, 4-place, 120 knots, private pilot, \$30/hr. wet; Call L. Damewood, 482-5572.

D-35 Bonanza, E225-8, hyd. prop., IFR equipped, sell all 17K or part, or lease/rent. Call Chuck Lewis, 488-3265.

Piper Warrior PA-28-161, IFR, for rent, \$38/hr. wet; Cessna 150, \$27/hr. wet; Houston Gulf, no membership, no dues. Call 946-1750 after 2 p.m.

## RVs & Mobile Homes

26' Airstream trailer, AC, heat, shower, good condition, price negotiable. Call 681-3825.

1980 Sundowner 8 x 40' mobile home, 1 BR, near Texas A&M campus, for your Aggie student. Call Bill, x4007 or 649-4851 after 6 p.m.

## Musical Instruments

Yamaha piano, walnut satin finish, only 1 year old, perfect condition, \$2,200. Call 480-1914 evenings.

5-string banjo gold plated, Stewart MacDonald pot assembly. Call 488-5877.

Holton Euphonium: 4-valve model B-101 w/case, good condition, \$600 negotiable. Call Rick, 488-5660, x510 or 280-9775.

Baldwin piano, Acrosonic, excellent condition, \$750. Call x5893 or 488-5162.

## Audiovisual & Computers

Bose 901 series III speakers, 2 pair, each pair includes left and right speaker w/active filter, \$600/pair. Call 482-6763.

Space Fury, full size video arcade game, wood cabinet, talking, mint condition, great for playroom, make offer. Call 334-3370.

80-column thermal printer for Commodore 64 computer, \$100. Call Drew Potter, x5039 or 474-4011.

Wish to make contact with local area Atari and Commodore home computer owners for purposes of trading equipment, software and information. Call Dick Ramsell, x5028.

GE 25" color console TV, just repaired, selling for parts' cost, \$125. Call Jack Zill, 472-7892.

Byte magazines, 1976-80 issues, almost complete, excellent condition, 53 issues, \$35. Call 482-8729.

Toshiba KT-V51 portable stereo cassette player with AM/FM tuner pack, carrying case, folding headphones, original box and owner's manual, \$80. Call Kent, x6203 or 486-0860.

## Pets

Mixed breed puppies, free to good home. Call 332-8618 after 5 p.m.

## Household

Bunk beds with mattresses, good condition, \$175; blue bathtub, left-handed, like new, \$185. Call Angie, x2581 or 334-4936.

Moving sale, recliner, \$99; table w/6 chairs, \$100; double bed w/mattress, box springs, \$75; shown by appt. only. Call Karen, x6268.

Formal living room set, green, like new; formal dining room set, white; armoire, large, dark wood. Call Marland, x4819 or 488-8880 after 5 p.m.

Dinette table/4 chairs, \$95; 2 bar stools, \$20; antique French chair, \$55; large gold leaf coffee table, bargain, \$425; country French table, \$35. Call 488-5564.

Heritage bedroom suite, Spanish, triple dresser twin mirrors, nightstand, king-size headboard, armoire, cost \$2,000, sell for \$700. Call 334-1853 after 5 p.m.

Twin bed, spring, mattress and frame, \$50. Call Nering, 481-0608 after 5:30 p.m.

Dishwasher, good condition, \$100. Call 482-6816, x3566 or x3781.

Extra long, comfortable blue floral sofa in very good condition, \$50. Call Thompson, x4121 or 488-8389.

Large L-shaped, 10.5' x 8' modern sofa, beige with touch of green, used, \$250; 2 large brass lamps, used, \$25 each. Call Dick Ramsell, x5028.

Sofa, blue/green/tan plaid, excellent condition, \$100. Call Ginger, x5238 or 538-3395 after 6 p.m.

Lighted curio cabinet, nearly new, \$110. Call Tom, 480-2776.

Matching sofa & love seat, brown, black & white; coffee table, good condition, \$150. Call 996-0356 after 6 p.m.

Wooden writing desk; queen sofa bed; oversized chairs; storage trunks; hanging lamp. Call 333-9234.

Sofa, 3 piece set, \$35; couch, \$35. Call 482-6609.

China hutch, \$100 or best offer; 8-piece china set, Adagio by Noritake, \$300; crystal, 5 piece, \$100. Call Glenn, 480-8800, x74 or 943-1790.

## Miscellaneous

Honey, \$10/gallon, smaller amounts available. Call Clarence Blume, x5159 or 554-2911.

4 Montgomery Ward tires, 165R13 steel-belted radials, \$20. Call 486-7873.

Weight bench, \$35; ski set, \$35;

barbecue grill, \$25. Call 482-6609.

Tickets, 1984 Olympic games: 2 — \$200, opening ceremony; 2 — \$200, closing ceremony; accepting all bids. Call Travis, x2074 or 333-3258.

Bay Area Racquet Club family membership, \$350. Call Susan, 488-9005.

New front end parts, fuel pump, oil & air filters for 1969 Fairlane/comparable Ford product, half price. Call Don, x2326.

Zapata Co. hunting lease, doves, quail, hogs, deer, 4,400 acres, \$1,250/gun. Call Don, x4824.

Karate, Goju Ryu (Okinawan), no charge private instruction. Call Bob, 332-0178 after 6 p.m.

Tennis rackets, Dunlop McEnroe, new \$25, frame only, \$20; Wilson Advantage, used, \$20; Head Comp 3, used \$25; all for \$80. Call John Lo, x4107 or 482-8457.

Smith-Corona Coronet portable electric typewriter with correction cartridge feature, excellent condition, \$100. Call Betty, x5111 or 334-6821 after 5 p.m.

IBM Correcting Selectric II typewriter, 4 years old, excellent condition, \$650. Call 482-1535.

2 roundtrip air tickets plus 3 nights, 4 days accommodations in Costa Rica and an entertainment package, valued \$1,000, make offer. Call Sam, x4581 or x5326.

Yard sale: house plants, tropicals and hanging baskets, May 11, 12, 13. Merrifield, 18610 Carriage Court, Nassau Bay, 333-2437.

5 steel rims with 165R13 Bridgestone tires (4 used) from 1980 Mazda RX-7, \$115 for set, pieces negotiable. Call D. Smith, x6455 or 280-0027.

Greenhouse, 12' x 17' aluminum frame w/reinforced fiberglass, cedar shelves, sunshade, evaporative AC, gravel floor, pots, must sell, \$800. Call 488-0541.

Air conditioner, 3-ton self-contained for mobile home, works fine, \$200. Call B. Craig, x4031 or 420-2936.

Attention Fishermen: brand new Lowrance Eagle depth finder, \$100. Call Don, 280-4244 before 4 p.m.

Children's hobby horse, spring type, extra large, \$15. Call 482-8729.

## Gilruth Center News

Call x3594 for more information

**Tennis classes** — Beginning and intermediate tennis classes will be offered at the Rec Center starting May 7 and 9, respectively, the beginner's class teaches the basic fundamentals, and meets from 5:15 to 6:45 p.m. Mondays for eight weeks. The intermediate class focuses on improving your stroke and meets from 5:15 to 6:45 p.m. Wednesdays for eight weeks. The cost for each class is \$28 per person.

**USVBA tryouts** — Tryouts are still open for the men's United States Volleyball Team. If you're interested, call Helen Munk at x3594.

**Guitar lessons** — Beginning and intermediate guitar lessons will begin in May at the Rec Center. The beginner's class meets starting May 16 from 7 to 8 p.m. for six weeks. The intermediate's class meets starting May 16 from 8 to 9 p.m. for six weeks. Cost for each class is \$25.

**SCUBA** — The next NAUI-certified basic SCUBA course begins June 25. Class meets from 6:30 to 9:30 p.m. Mondays for eight weeks. Pool sessions begin at 7:30 p.m. Wednesdays. The cost is \$45 per person and enrollment is limited.

**Ladies weight training** — This four-week course begins May 7 and meets Mondays and Wednesdays from 7 to 8 p.m. The cost is \$20 per person and enrollment is limited.

**Feature movie** — The Rec Center's next feature movie showing will be "The Big Chill" on May 19. The program begins with a social hour at 6 p.m., dinner at 7 p.m. and the movie at 8 p.m. Tickets may be purchased in the Bldg. 11 Exchange Store for \$5 per person.

## Cookin' in the Cafeteria

Week of April 30 - May 4, 1984

Week of May 7 - 11, 1984

**Monday:** French Onion Soup; Beef Chop Suey, Polish Sausage w/German Potato Salad, Breaded Veal Cutlet (Special); Okra & Tomatoes, Green Peas, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

**Tuesday:** Split Pea Soup; Salisbury Steak, Shrimp Creole, Fried Chicken (Special); Mixed Vegetables, Beets, Whipped Potatoes.

**Wednesday:** Seafood Gumbo; Fried Catfish w/Hush Puppies, Braised Beef Rib, BBQ Plate, Weiners & Beans, Shrimp Salad, Stuffed Bell Pepper (Special); Corn O'Brian, Rice, Italian Green Beans.

**Thursday:** Chicken Noodle Soup; Beef Strogan